REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the following remarks.

Claims 1 and 7-14 are currently pending. No amendment has been made.

In the Office Action mailed April 17, 2007, the Examiner rejected claim 1 under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 5,524,433 to Adamczyk, Jr. et al. ("Adamczyk") in view of U.S. Patent No. 5,201,173 to Fujimoto et al. ("Fujimoto") . The Examiner also rejected claims 7-10 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Adamczyk in view of Fujimoto and further in view of U.S. Patent No. 5,613,359 to Zahn et al. ("Zahn") and claims 11-14 under 35 U.S.C. 103(a) as being allegedly unpatentable over Adamczyk in view of Fujimoto and Zahn, and further in view of U.S. Patent No. 5,606,855 to Tomisawa. To the extent that the rejections remain against the claims as pending, Applicants hereby traverse the rejections as follows.

Applicants thank Examiner Nguyen for his courtesy extending to Applicants' representative during a personal interview on June 29, 2007. During the interview, the cited prior art references Adamczyk and Fujimoto have been discussed and an agreement has been reach. The Examiner agreed that the combination of Adamczky and Fujimoto fails to teach or suggest an EGR correction coefficient calculating means to calculate an EGR correction coefficient and a fuel injection quantity correcting means for correcting a quantity of fuel injection based on at least the feedback correction coefficient and the EGR correction coefficient, as recited in Claim 1. Therefore, the

Examiner concluded that the pending claims are allowable over Adamczky in view of Fujimoto, but he will conduct further search and consideration.

Applicants again emphasize Claims 1 and 7-14 are patentable over Adamczyk in view of Fujimoto for the reasons stated below.

The system for purifying exhaust gas generated by an internal combustion engine of claim 1 includes, among other things, a bypass branching out from the exhaust pipe at a location downstream of the catalyst and merging to the exhaust pipe downstream of the branching point, valve control means which operates the valve means to open the bypass for a period since starting of the engine to introduce the exhaust gas to the bypass such that the adsorber installed in the bypass adsorbs the unburnt component in the exhaust gas and then closes the valve means to recirculate the adsorbed unburnt component through the conduit with the exhaust gas after having desorbed from the adsorber, feedback loop means having an adaptive controller with an adaptation mechanism that estimates an adaptive parameter, the adaptive parameter calculating a feedback correction coefficient based on the estimated adaptive parameter such that the detected air/fuel ratio converges to a desired air/fuel ratio, EGR correction coefficient calculating means, and fuel injection correcting means based on the feedback correction coefficient and the EGR correction coefficient.

In Paragraph 3 of the Office Action, the Examiner asserted that as shown in Figure 7, Adamczyk, discloses a system . . . comprising: . . . feedback loop means (35) having an adaptive controller with an adaptation mechanism that estimates an adaptive parameter (an amount of HC desorbed from the adsorber recirculating back to the engine), the adaptive controller calculates a quantity of fuel injection based on the

estimated adaptive parameter such that the detected air-fuel ratio converges to a desired air-fuel ratio (stoichiometric air-fuel ratio) (see at least lines 56-59 of column 7), . . . EGR correction coefficient calculating means (35) for . . . (line 65 of column 7 to line 6 of column8), and fuel injection quantity determining means (35) for . . . (lines 56-59 of column 7), . ..

As admitted by the Examiner, Adamczyk fails to teach or suggest a feedback loop means having an adaptive controller. To support his rejection of obviousness, the Examiner asserted that Fujimoto discloses a catalyst temperature control system for an internal combustion engine, comprising an EGR passage (18) to recirculate a portion of an exhaust gas stream back to an engine intake. The Examiner also pointed out the embodiment described from col. 6, line 39 to col. 7, line 11 for evidence. Therefore, the Examiner concluded that it would have been obvious for one skilled in the art to have utilized the teaching by Fujimoto in the system of Admaczyk.

Applicants respectfully disagree. In addition to the lack of the feedback loop means, Adamczyk also fails to teach or suggest an EGR correction coefficient calculating means, and fuel injection correcting means based on the feedback correction coefficient and the EGR correction coefficient, as recited in Claim 1.

The embodiments described in lines 56-59 of column 7 of Adamczyk are shown in FIGS. 7 and 8, in which "under the control of EEC 35 which determines the fuel delivery rate, the engine 32 produces a stoichiometric exhaust gas mixture at the inlet port to the trap 31."

The EEC 35 of Adamczyk, however, is an electronic engine controller, not an adaptive controller with adaptation mechanism, as claimed in Claim 1 and exemplarily

shown in FIGS. 10 and 11 of the specification. That is, EEC 35 is a mere controller that calculates (estimates) the total HC desorbed from the trap 31 in accordance with equations (3)(4)(5) and the total HC stored in the trap 31 in accordance with equations (1)(1a) and (2), not a feedback correction coefficient.

The Examiner alleges that the amount of HC desorbed from the adsorber (reciruclating back to the engine) of Adamczyk corresponds to the adaptive parameter and the engine 32 of Adamczyk that produces a stoichiometric exhaust gas mixture under the control of EEC 35 which determines the fuel delivery rate corresponds to the feedback loop means calculates a feedback correction coefficient based on the estimated adaptive parameter such that the detected air-fuel ratio converges to a desired air-fuel ratio, as recited in Claim 1.

However, what EEC 35 actually does, as described in line 56-57 of column 7, is to adjust the fuel delivery rate. There is no suggestion in Adamczyk that the EEC 35 calculates a feedback correction coefficient.

The Examiner further asserted that Adamczyk discloses an EGR correction coefficient calculating means (35) for . . . the air intake system recited in Claim 1, as shown from lines 65 of column 7 to line 6 of column 8.

The passages from line 65 of column 7 to line 6 of column 8 describe that in the embodiment of FIG. 7, in which the trap 31 is purged with hot exhaust gases, the total HC desorbed from the trap on a gram basis is given by Eq. (5), where C 4 is 103921.3 and AM2(t) is the recirculated air mass flow rate in lbm/hr. Such passages, however, only describe that the desorbed HC amount is calculated from equation (5) without teaching or suggesting calculating an EGR correction coefficient.

The Examiner also asserted that Adamczyk discloses a fuel injection quantity correcting means (35) recited in Claim 1 by referring to the passages described in lines 51-59 of column 7 of Adamczyk.

Such passages describes the embodiments of FIGS. 7 and 8 that monitor an active HC trap 31 with a single UEGO sensor 88 positioned downstream of the trap to measure the air/fuel ratio X(t). In the embodiment depicted in FIG. 7, the trap 31 is purged with hot exhaust gases which flow via a return pipe 84 into the intake manifold 37 of the engine 32. Under the control of EEC 35 which determines the fuel delivery rate, the engine 32 produces a stoichiometric exhaust gas mixture at the inlet port to the trap 31.

Again, there is no suggestion of correcting the quantity of fuel injection based on at least the feedback correction coefficient and the EGR correction coefficient, as recited in Claim 1.

Fujimoto fails to cure the deficiency of Adamczyk as mentioned above because Fujimoto merely describes a catalyst temperature control system for an internal combustion engine. Fujimoto fails to teach or suggest feedback loop means having an adaptive controller with an adaptive mechanism that estimates an adaptive parameter, the adaptive controller calculating a feedback correction coefficient based on the estimated adaptive parameter such that the detected air/fuel ratio converges to a desired air/fuel ration, as recited in Claim 1.

In Fujimoto, an EGR, passage (conduit) 18 is connected to an exhaust pipe 14 to recirculate a part of exhaust gas to the air intake system. Since the passage 18 is connected to the exhaust pipe 14 upstream of a three-way catalyst 16, the exhaust gas

to be recirculated includes (not purified) CO, HC and NOx components. As the amount of unburnt component, i.e., HC component is not so large, it suffices if the fuel injection period TOUT in expression (1) is corrected by KRGR (mainly determined by map retrieval as mentioned in S63 and S67 in Fig. 7.

Therefore, Fujimoto fails to teach or suggest at least the combination of a bypass branching out from an exhaust pipe at a location downstream of the catalyst, an adsorber installed in the bypass, a valve means, a conduit connected to the bypass and a valve control means which operates the valve means to open the bypass for a period since starting of the engine to introduce the exhaust gas to the bypass such that the adsorber adsorbs the unburnt component in the exhaust gas and the adsorbed unburnt component is recirculated through the conduit with the exhaust gas after having desorbed from the adsorber, as recited in Claim 1.

According to the present invention, the desorbed unburnt component is supplied back to the air intake system through the EGR conduit with the exhaust gas. As the gas to be recirculated has been collected for the period since engine starting and the gas is purified by the three catalytic converters 40, 42 and 44, the amount of unburnt, i.e., combustible component is relatively large, thereby acting as serious disturbance in the air/fuel ratio feedback loop.

For this reason, in the claimed invention, the feedback loop means is provided with the adaptive controller (with the adaptation mechanism that estimates the adaptive parameter) which calculates the feedback correction coefficient based on the estimated parameter such that the detected air/fuel ratio converges to the desired air/fuel ratio.

As described above, none of Adamczyk and Fujimoto teaches or suggests such features.

To establish a *prima* facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §2143. Accordingly, it is respectfully submitted that none of Adamczyk and Fujima, when taken singly or in combination, teaches or suggest every limitation of amended claim 1. Therefore, it would not have been obvious for one skilled in the art to combine these two references to achieve the invention.

For at least these reasons, Applicants respectfully submit that amended claim 1 is patentable over Adamczyk in view of Fujima and the 35 U.S.C. §103(a) rejection should be withdrawn.

With respect to the rejection of claims 7-14, the Applicants submit that at least due to their dependency from patentable independent claim 1, they are likewise allowable.

CONCLUSION

For all of the above reasons, it is respectfully submitted that the claims now pending patentability distinguish the present invention from the cited references. Accordingly, reconsideration and withdrawal of the outstanding rejections and an issuance of a Notice of Allowance are earnestly solicited.

Should the Examiner determine that any further action is necessary to place this application into better form, the Examiner is encouraged to telephone the undersigned representative at the number listed below.

In the event this paper is not considered to be timely filed, the Applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 01-2300. The Commissioner is hereby authorized to charge any fee deficiency or credit any overpayment associated with this communication to Deposit Account No. 01-2300, with reference to Attorney Docket No. 107101-00050.

Respectfully submitted,

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